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Composition for washing keratin materials, based on
water-soluble organosilicon compounds

5 The present invention relates in general to aqueous compositions for washing keratin materials, and in particular the hair and/or the skin, comprising water-soluble organosilicon compounds, and also to washing processes using these compositions.

10 It is known that introducing cosmetically active organic compounds such as cationic polymers and silicones into detergent cosmetic compositions such as shampoos gives these compositions disentangling properties and provides washed hair with softness and lightness. However, the
15 "styling" properties characterized by an effect of maintaining volume and hold on the hair are insufficient and do not withstand the hair being washed with a standard shampoo.

20 It is also known practice to use polymer compositions which have been made partially water-soluble. Thus, certain polymer compounds may be used in water without adding any co-solvent. In this case, the limitation lies in the fact that these polymer compounds are partially,
25 or even totally, removed by rinsing the hair. Consequently, the effect due to the polymer compounds is very limited after rinsing. Ultimately, this limits the effect of rinse-out treatments (shampooing, conditioning), but also reduces the advantage of such
30 compositions used in leave-in mode (lacquers, mousses, hairsetting lotions, etc.) since the user loses the effect acquired by the treatment when he washes his hair.

Efforts have thus been devoted to finding compounds for
35 formulating cosmetic compositions which may be used in water and which show remanence of their effect when the

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hair is rinsed.

Thus, US patent No. 4 344 763 (Gillette) describes cosmetic compositions comprising an organosiloxane monomer such as an aminoalkylalkoxysilane and an organic titanate dissolved in an alcohol.

Patent EP-159 628 describes a permanent-waving and strengthening composition for the hair containing an alkyltrialkoxysilane, and patent FR-2 029 696 describes a process for manufacturing a hair-fixing product containing an organic resin comprising acid groups that are totally or partially neutralized with organosilicon compounds containing amino radicals.

The compositions and products described in these documents do not correspond to washing compositions, and in particular compositions for washing the hair such as shampoos.

There is thus a need for a detergent cosmetic composition, in particular for washing the hair, which is essentially aqueous and which produces very pronounced volumizing, hold and texturing effects on the hair which are resistant to washing cycles, while at the same time maintaining care effects on the hair.

One subject of the present invention is thus aqueous detergent cosmetic compositions for washing keratin materials, in particular shampoos, which give the hair a long-lasting styling effect and a pleasant feel, and in particular pronounced volumizing, hold and texturing effects which are resistant to washing cycles.

The Applicant has noted, surprisingly, that it is possible to formulate compositions for washing keratin

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materials, in particular shampoos, which have the desired properties, by using in these compositions water-soluble organosilicon compounds comprising 1 to 3 silicon atoms, at least one basic chemical group and at least two hydrolyzable or hydroxyl groups per molecule.

It has been found that applying such compositions produces a pronounced styling effect which withstands rinsing and washing.

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According to the invention, the compositions for washing keratin materials comprise, in a cosmetically acceptable aqueous medium, at least 0.02% by weight, relative to the total weight of the composition, of one or more water-soluble organosilicon compounds chosen from organosilanes comprising one silicon atom and organosiloxanes comprising two or three silicon atoms, the organosilicon compounds also comprising at least one basic chemical function and at least two hydrolyzable or hydroxyl groups per molecule, and at least 4% by weight, relative to the total weight of the composition, of a detergent surfactant chosen from anionic, amphoteric and nonionic surfactants, and mixtures thereof.

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The organosilicon compounds that are useful in the compositions of the present invention are chosen from water-soluble organosilanes comprising a silicon atom and water-soluble organosiloxanes comprising two or three silicon atoms, preferably two silicon atoms. They must also comprise at least one basic chemical function, and preferably only one basic chemical function. The basic chemical function may be any function which gives the silicon compound a basic nature without harming its solubility in water and is preferably an amine function such as a primary, secondary or tertiary amine function. The basic chemical function of the silicon compounds

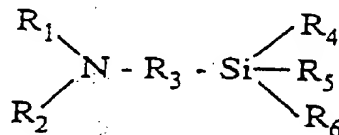
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according to the invention may optionally comprise other functions such as, for example, another amine function, an acid function or a halogen function.

- 5 The organosilicon compounds that are useful in the compositions of the present invention also comprise at least two hydrolyzable or hydroxyl groups per molecule. The hydrolyzable groups are preferably alkoxy, aryloxy or halogen groups. They may also optionally comprise other
10 chemical functions such as acid or amine functions.

The organosilanes that are preferred according to the invention correspond to the formula:

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in which:

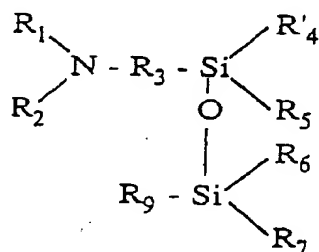
- R_4 represents a halogen or a group OR' or R'_1 ;
 R_5 represents a halogen or a group OR'' or R'_2 ;
 R_6 represents a halogen or a group OR''' or R'_3 ;
 20 and R_1 , R_2 , R_3 , R' , R'' , R''' , R'_1 , R'_2 and R'_3 represent, independently of each other, a saturated or unsaturated, linear or branched hydrocarbon-based group optionally bearing additional chemical groups such as acid or amine groups, R_1 , R_2 , R' , R'' and R''' also possibly
 25 denoting hydrogen, and
 at least two of the groups R_4 , R_5 and R_6 being other than groups R'_1 , R'_2 and R'_3 .

- Preferably, R_1 , R_2 , R' , R'' and R''' , R'_1 , R'_2 and R'_3
 30 represent a C_1 to C_{12} alkyl group, a C_6 to C_{14} aryl group, a (C_1 to C_8) alkyl (C_6 to C_{14}) aryl group and a (C_6 to C_{14}) aryl (C_1 to C_8) alkyl group; and R_3 is preferably a C_1 to

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C₁₂ alkyl group, a C₆ to C₁₄ aryl group, a (C₁ to C₈) alkyl (C₆ to C₁₄) aryl group and a (C₆ to C₁₄) aryl (C₁ to C₈) alkyl group.

- 5 The organosiloxanes that are preferred in the compositions of the present invention may be represented by the formula:



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in which:

- R₁, R₂, R₃, R₅ and R₆ are defined as above;
 R'₄ represents a halogen or a group OR₁₁;
 R₇ represents a halogen or a group OR₁₀ or R''₁;
 15 R₉ represents a halogen or a group OR₈, R''₂ or R₃NR₁R₂;
 R''₁, R''₂, R₈, R₁₀ and R₁₁ represent a saturated or unsaturated, linear or branched hydrocarbon-based group optionally bearing additional chemical groups such as basic solubilizing groups;
 20 R₁₁, R₁₀ and R₈ also possibly denoting hydrogen.

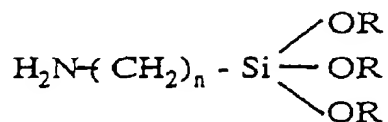
Preferably, R''₁, R''₂, R₈ or R₁₀ and R₁₁ represent a C₁ to C₁₂ alkyl group, a C₆ to C₁₄ aryl group, a (C₁ to C₈) alkyl (C₆ to C₁₄) aryl group and a (C₆ to C₁₄) aryl (C₁ to C₈) alkyl
 25 group.

At least one of the groups R₆, R₇ and R₉ denotes a halogen or a group OR''', OR₁₀ or OR₈.

- 30 Preferably, the halogen is chlorine.

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One class of organosilicon compounds that is particularly preferred consists of compounds of formula:



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in which the radicals R, which may be identical or different, are chosen from C₁-C₆ alkyl radicals such as methyl, ethyl, propyl and butyl and n is an integer from 1 to 6 and preferably from 2 to 4.

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One organosilicon compound which is particularly recommended is γ-aminopropyltriethoxysilane.

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The content of organosilicon compounds in the compounds of the invention relative to the total weight of the composition is at least 0.02% by weight and preferably at least 0.5% by weight, and up to 20% by weight.

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The content of organosilicon compounds according to the invention is determined by the usual analytical methods such as silicon-29 and proton NMR spectroscopy and chromatography.

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As mentioned above, the detergent compositions according to the invention contain at least one detergent surfactant chosen from anionic, amphoteric and nonionic surfactants with detergent properties.

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Among the anionic surfactants which may be mentioned are the alkali metal salts, ammonium salts, amine salts, amino alcohol salts and magnesium salts of the following compounds: alkyl sulfates, alkyl ether sulfates, alkyl-amidoether sulfates, alkylaryl polyether sulfates, mono-glyceride sulfates; alkyl sulfonates, alkylamide sulfonates, alkylaryl sulfonates, olefin sulfonates, paraffin

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5 sulfonates; alkyl sulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates; alkyl sulfosuccinamates; alkyl sulfoacetates; alkyl phosphates, alkyl ether phosphates; acyl sarcosinates, acyl isethionates and N-acyl taurates.

The alkyl or acyl radical in these various compounds generally consists of a carbon-based chain containing from 12 to 20 carbon atoms.

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Among the anionic surfactants which may also be mentioned are fatty acid salts such as oleic, ricinoleic, palmitic and stearic acid salts; coconut oil acid or hydrogenated coconut oil acid; acyl lactylates, in which the acyl radical contains from 8 to 20 carbon atoms.

15

Surfactants considered as weakly anionic can also be used, such as polyoxyalkylenated carboxylic alkyl or alkylaryl ether acids or salts thereof, polyoxyalkylenated carboxylic alkylamido ether acids or salts thereof, and alkyl-D-galactosiduronic acids or salts thereof.

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The nonionic surfactants are chosen more particularly from polyethoxylated, polypropoxylated or polyglycerolated fatty acids or alkylphenols or alcohols, with a fatty chain containing 8 to 18 carbon atoms, the number of ethylene oxide or propylene oxide groups being between 2 and 50 and the number of glycerol groups being between 2 and 30.

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Mention may also be made of copolymers of ethylene oxide and propylene oxide; condensates of ethylene oxide and of propylene oxide with fatty alcohols; polyethoxylated fatty amides preferably containing 2 to 30 mol of ethylene oxide; polyglycerolated fatty amides preferably comprising 1 to 5 and in particular 1.5 to 4 glycerol

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groups; polyethoxylated fatty amines preferably containing 2 to 30 mol of ethylene oxide; oxyethylenated fatty acid esters of sorbitan with 2 to 30 mol of ethylene oxide; fatty acid esters of sucrose, fatty acid
5 esters of polyethylene glycol, alkylpolyglycosides, carbamate or amide derivatives of N-alkylglucamines, aldobionamides, amine oxides such as alkylamine oxides or of N-acylamidopropylmorpholine.

10 The preferred amphoteric surfactants are secondary or tertiary aliphatic amine derivatives, in which the aliphatic radical is a linear or branched chain containing 8 to 22 carbon atoms and which contains at least one carboxylate, sulfonate, sulfate, phosphate or
15 phosphonate water-solubilizing anionic group; (C₈-C₂₀)-alkylbetaines, sulfobetaines, (C₈-C₂₀)alkylamido(C₁-C₆)-alkylbetaines or (C₈-C₂₀)alkylamido(C₁-C₆)alkylsulfo-
betaines.

20 Among the amine derivatives which may be mentioned are the products sold under the name Miranol, such as those described in patents US-A-2 528 378 and 2 781 354 and classified in the CTFA dictionary, 7th edition, 1997, under the name Disodium Cocoamphodiacetate, Disodium
25 Lauroamphodiacetate, Disodium Capryloamphodiacetate, Disodium Caproamphodiacetate, Disodium Cocoamphodipropionate, Disodium Lauroamphodipropionate, Disodium Caproamphodipropionate, Disodium Capryloamphodipropionate, Lauroamphodipropionate acid,
30 Cocoamphodipropionate acid.

The surfactants are used in the compositions in accordance with the invention in proportions that are sufficient to give the composition a detergent nature,
35 generally in the proportion of at least 4% by weight and preferably between 5% and 50% by weight relative to the

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total weight of the composition, and in particular between 8% and 35%.

5 The compositions according to the invention have a pH generally of between 5 and 12 and more particularly between 6 and 11.

10 The aqueous medium of the compositions consists either of water or of a mixture of water and solvent(s) chosen from lower alcohols, alkylene glycols and polyolethers; the water is present in proportions of greater than 20% and preferably greater than 45%.

15 The compositions according to the invention may also contain viscosity modifiers, such as electrolytes, for instance sodium chloride, thickeners, for instance cellulose derivatives such as, for example, carboxymethylcellulose, hydroxypropylcellulose, hydroxyethylcellulose, guar gum, hydroxypropyl guar gums, scleroglucans or xanthan gum.

20 These viscosity modifiers are used in proportions ranging up to 15% by weight relative to the total weight of the composition and preferably less than 6%.

25 The compositions in accordance with the invention can optionally also contain other agents, provided that they do not affect the stability of the compositions, such as cationic surfactants, cationic, anionic, amphoteric or nonionic polymers, or quaternized or non-quaternized proteins, or silicone oils, waxes, gums or resins.

35 The polymers, the cationic surfactants, the quaternized or non-quaternized proteins and the silicones are used in the cosmetic or dermatological compositions according to the invention in proportions of between 0.05% and 10% and

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preferably between 0.1% and 5% relative to the total weight of the composition.

5 The compositions according to the invention may also contain various adjuvants commonly used in cosmetics, such as fragrances, preserving agents, sequestering agents, foam stabilizers, propellants, colorants, antidandruff agents, ceramides, vitamins or provitamins, hydroxy acids, acidifying or basifying agents or other
10 adjuvants depending on the use envisaged.

15 The processes for washing and/or conditioning the hair or the skin consist in applying thereto a composition as defined above, this application being followed by rinsing.

20 The compositions in accordance with the invention may also be used as shower gels for washing the hair and the skin, in which case they are applied to wet skin and wet hair and are rinsed out after application.

The examples which follow are intended to illustrate the invention without, however, being limiting in nature.

25 **EXAMPLES**

Example 1:

The washing compositions in Table I below were formulated.

Table I

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	A	B
		(invention)
Sodium (C ₁₂ -C ₁₄)alkyl ether	8 AM	8 AM
sulfate oxyethylenated with [2.2		
mol of ethylene oxide, sold		
35 containing 70% AM		

	Laurylbetaine as an aqueous solution containing 30% AM	2 AM	2 AM
	Aminopropyltriethoxysilane (APTES)	-	5
5	Aqueous 0.1N hydrochloric acid solution at pH = 1	1.5	1.5
	Water qs	100	100

Evaluation of the treating properties:

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Locks of natural hair were treated with the two compositions, under the following conditions:

1 g of composition per 2.5 g lock

Exposure time = 10 minutes

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Rinsing with running water = passed between 2 fingers 20 times

Drying = 10 minutes at 60°C.

20

The two locks were then submitted to a panel of testers who were asked the question: "which lock is the more coated and the more textured"?

25

The 10 testers unanimously considered that the locks treated with composition B are more coated and have more texture than the locks treated with composition A.

Example 2:

The compositions in Table II below were formulated.

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Table II

		C	D (invention)
5	Sodium (C ₁₂ -C ₁₄)alkyl ether sulfate oxyethylenated with [2.2 mol of ethylene oxide, sold containing 70% AM	10 AM	10 AM
10	Alkylpolyglucoside as an aqueous solution containing 53% AM, sold under the name Plantacare®2000 UP by the company Henkel	5 AM	5 AM
	Aminopropyltriethoxysilane (APTES)	-	5
15	Aqueous 0.1N hydrochloric acid solution at pH = 1	1.5	1.5
	Water qs	100	100

Evaluation of the treating properties:

20 Locks were treated as in Example 1.

The two locks were then submitted to a panel of testers who were asked the question: "which lock is the more coated and the more textured"?

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The 10 testers unanimously considered that the locks treated with composition D are more coated and have more texture than the locks treated with composition C.

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